



Stability of Co- γ -Fe₂O₃ Tape

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P-11

N 93 - 15041

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Overview of Archival Stability of Recording Media

Environment	$\gamma\text{Fe}_2\text{O}_3$	$\text{Co}-\gamma\text{Fe}_2\text{O}_3$	BaFe	CrO_2	MP	CoNi	CoCr
Temp $\geq 50^\circ\text{C}$	●	●	●	○	○	●	●
Humidity $\geq 75\%$	●	●	●	●	●	●	●
Pollutants $\geq \text{Cl II}^*$	●	●	●	●	●	●	●
Temp & Humid	○	●	●	●	●	●	●
Temp & Poll	●	●	●	○	○	●	●
Humid & Poll	○	●	●	●	●	●	●
T & H & Poll	○	●	●	●	●	●	●

PRODUCTS:

Audio Cassette	Video	4 MByte	Hi-8mm
9T Comp. Tape	D-1	Diskettes	R-DAT
Lo-Density	Hi-Bias	Hi-8mm	D-2
Diskettes	Hi-Density	Diskettes	Audio

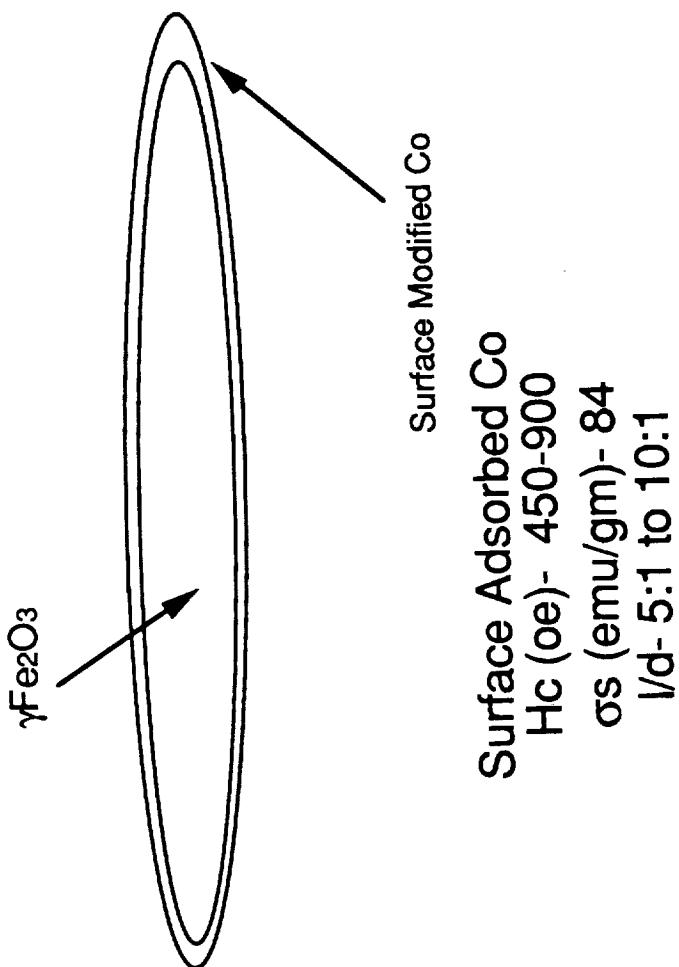
KEY: ● = GOOD ○ = FAIR ● = POOR

No corrosion or signal loss problems expected
May be suitable if some signal loss and/or bit errors can be tolerated
Unsuitable for storage under this condition

NOTES:
Interim recommendations, based on results of NML and others, as of January, 1991.
Does not include possible binder and substrate problems not specific to media type.



Co- γ -Fe₂O₃ Pigment



Surface Adsorbed Co
Hc (oe)- 450-900
 σ_s (emu/gm)- 84
Vd- 5:1 to 10:1



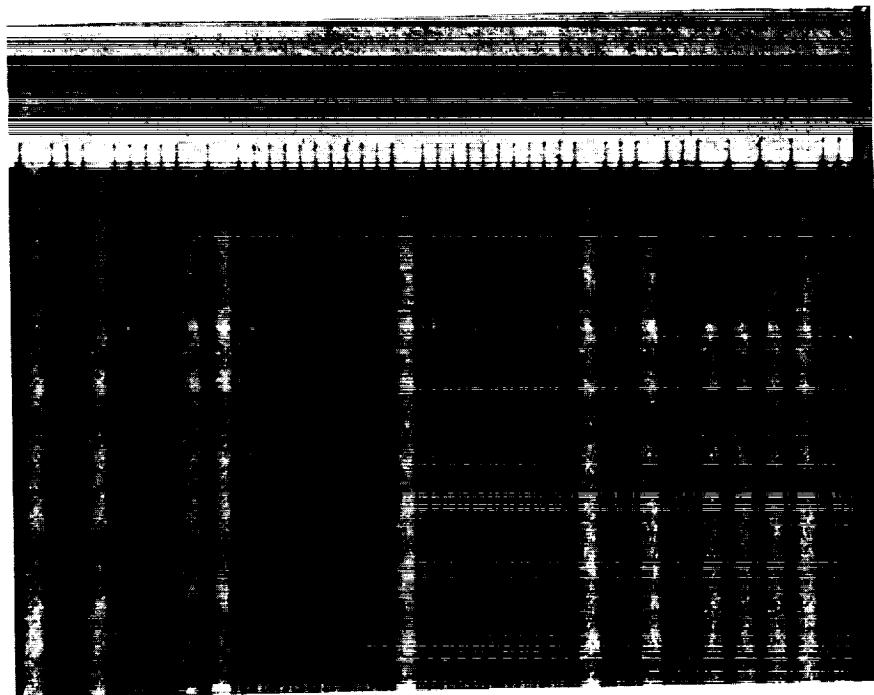
Storage Systems Using Co- γ -Fe₂O₃ Tape

System ID	Head	Media Format	Thickness (μ)	Capacity/Pkg (Gbits)	Durability (passes)
QIC 525	Fixed	1/4" Cart.	11	4.2	10,000
QIC 1350	Fixed	1/4" Cart.	13	10.8	10,000
Interferometrics	Fixed	1"x14" reel	16	5500	1,000
DCRsi	Trans.	1" Cart.	25	380	200
VHS	Helical	1/2" Cart.	20	32	NI
Digidata	Helical	1/2" Cart.	20	43	NI
V LDS	Helical	1/2" Cart.	16	80	NI
ID1	Helical	19mm Cart.	16	300	300
DCR	Helical	1" Cart.	25	240	200

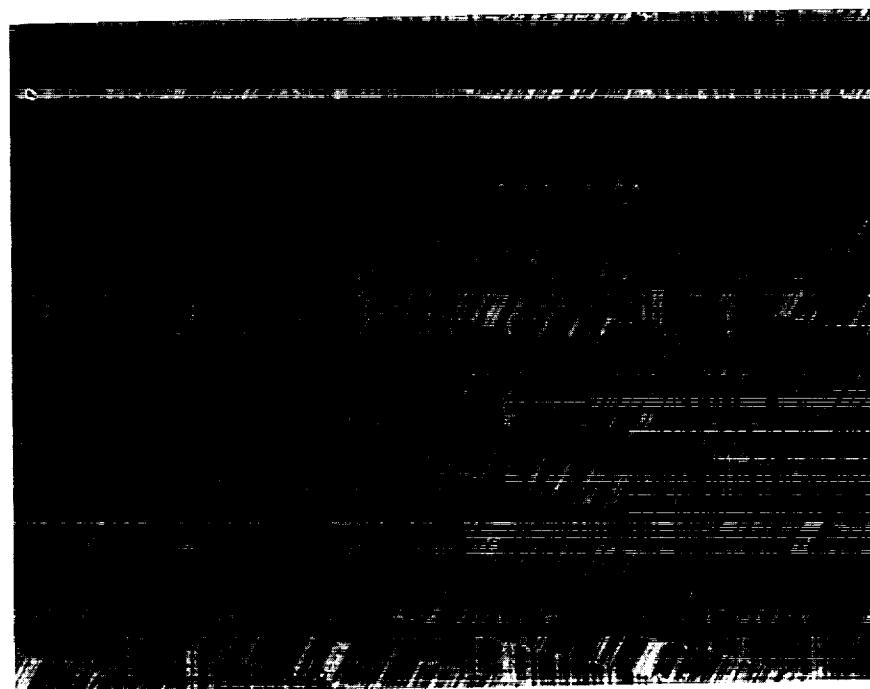
* NI - No Information

Recording Bit Density Comparison

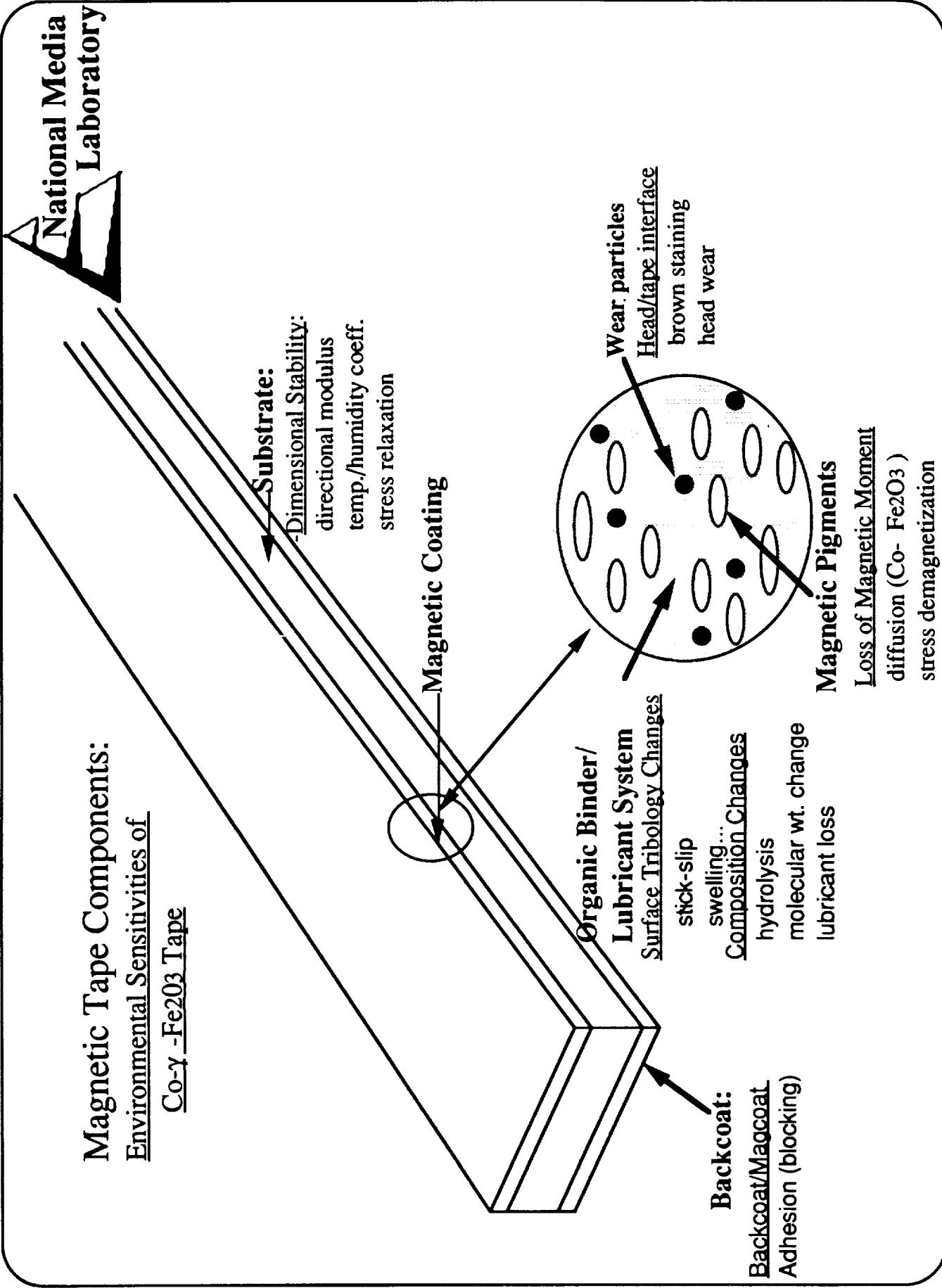
Linear, Low Density: 2060 bits per inch, 20 mil width; 165X.



Helical, High Density: 45,000 bits per inch, 1.2 mil width; 165X.

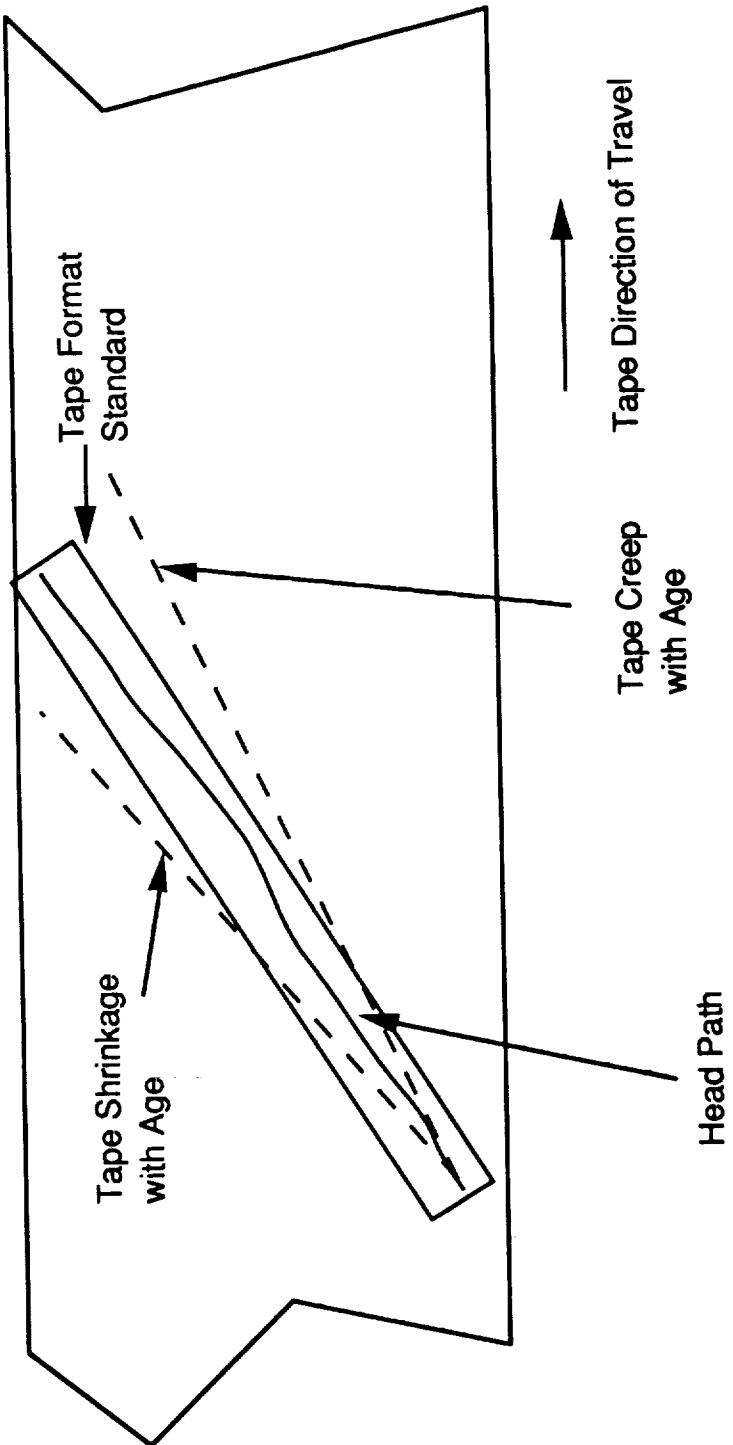


Magnetic Tape Components: Environmental Sensitivities of Co_x-Fe₂O₃ Tape



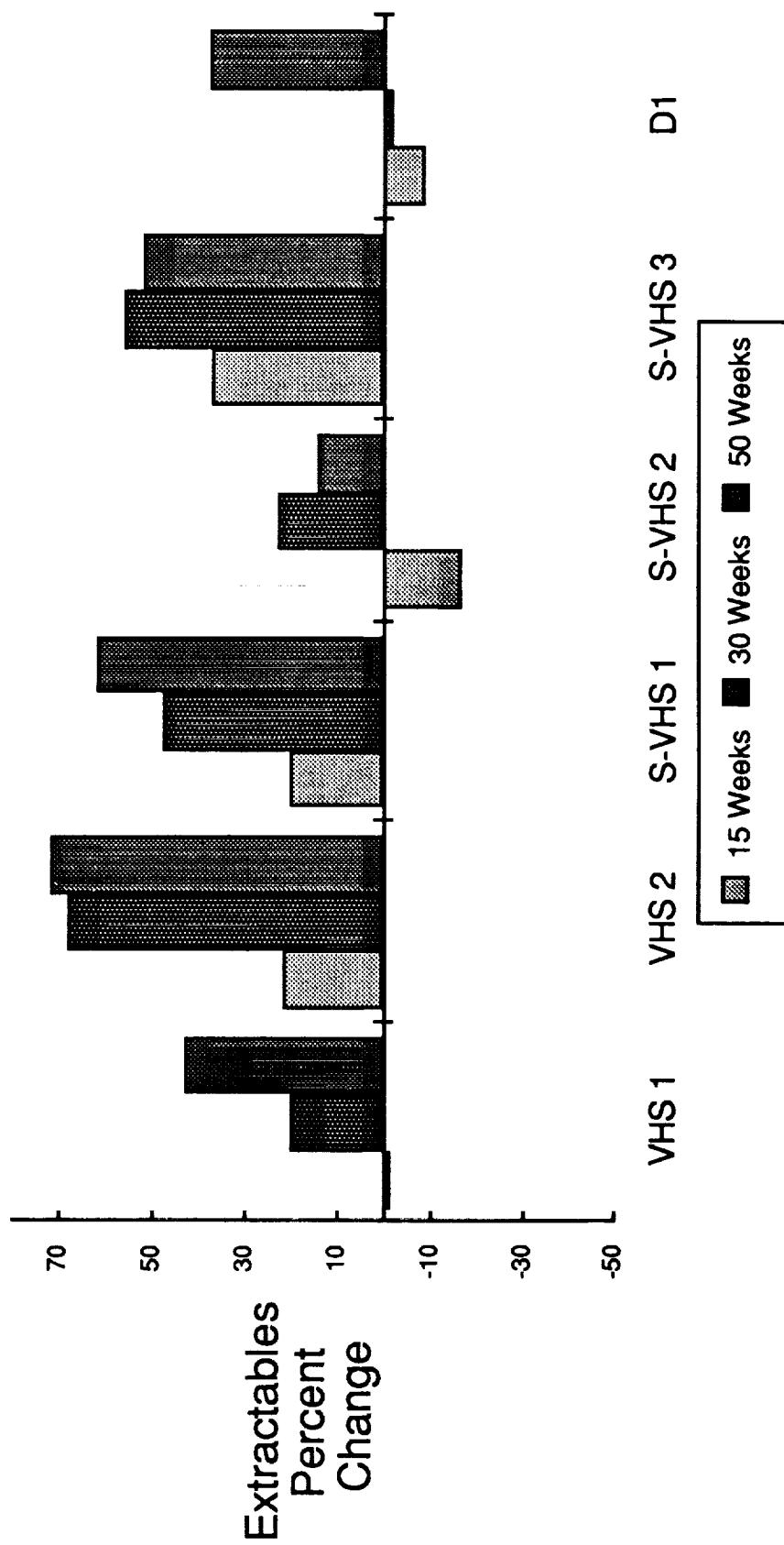


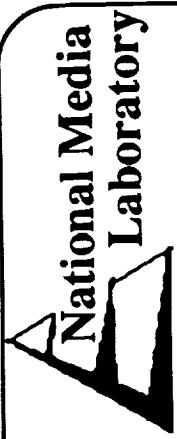
Dimensional Stability and Crossplay



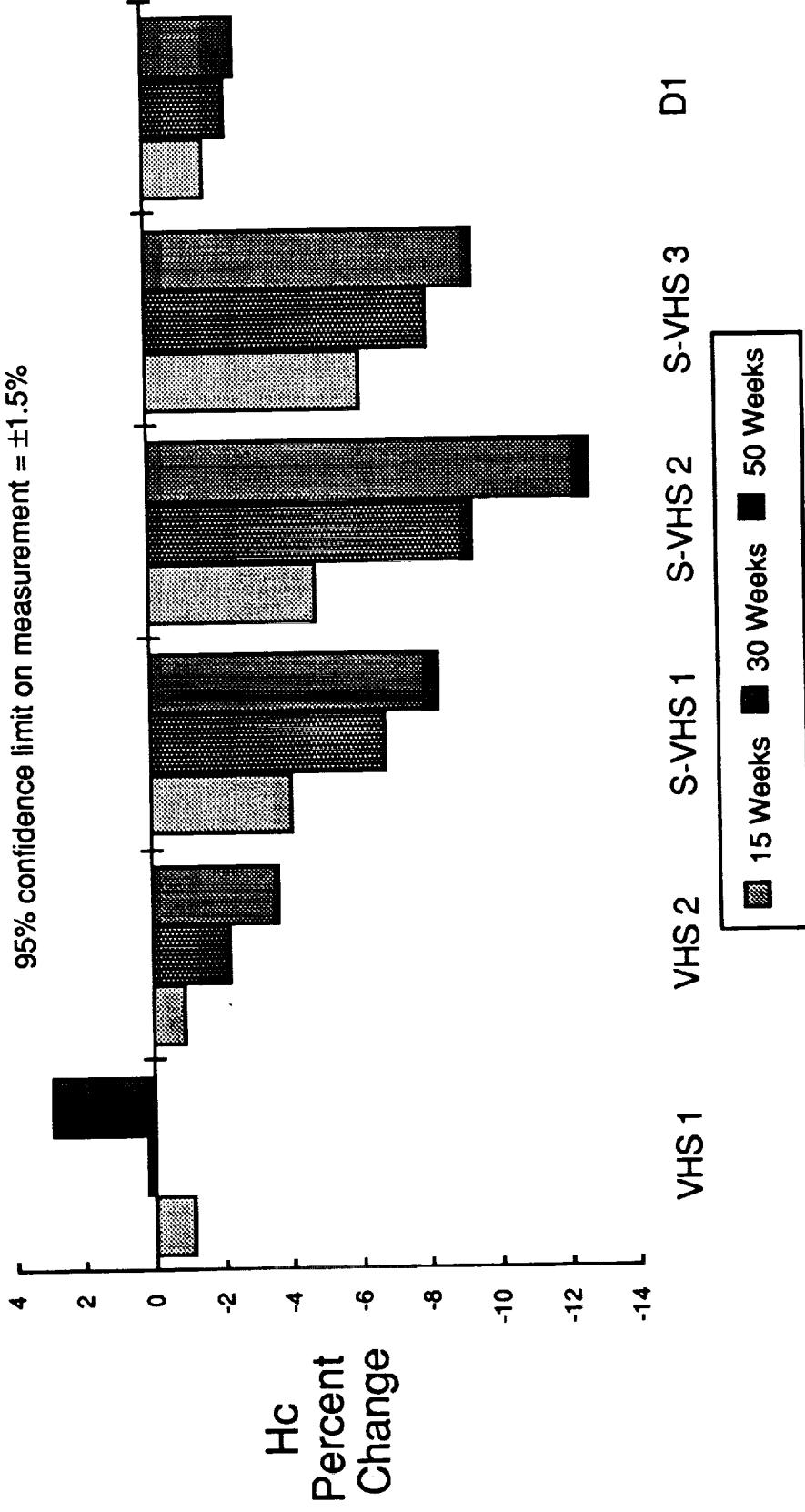


58°C - 90% RH Acetone Extraction





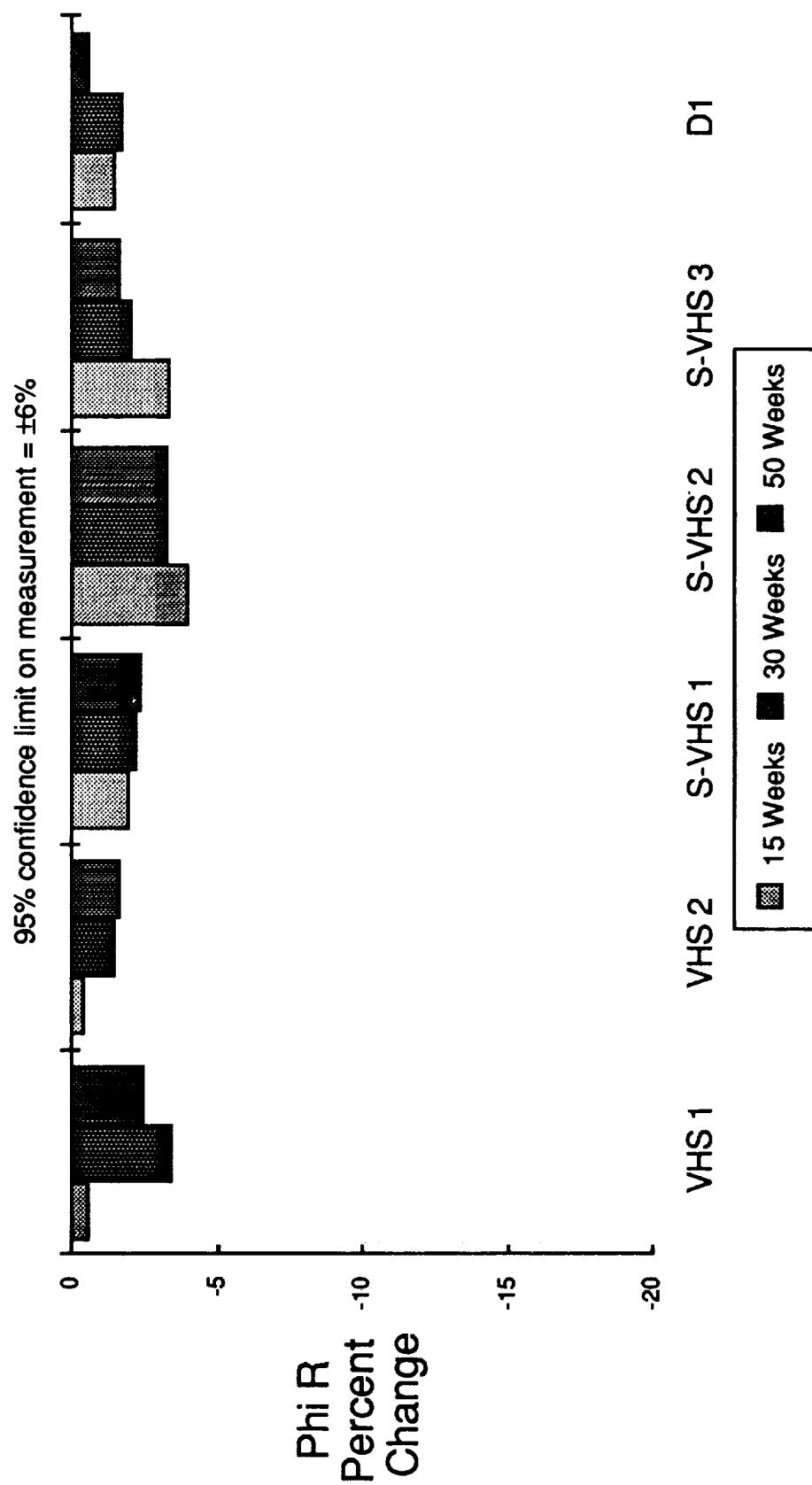
58°C - 90% RH Coercivity



NML DMC 7/24/91



58°C - 90% RH Phi R





Summary $\text{Co}-\gamma\text{-Fe}_2\text{O}_3$ Tape Stability

- Archive Stability: 10 yrs in a dry, controlled environment
 - Retensioning
 - Cleaning
 - Recertification
- Archive requirements are system specific
 - Wide range of system performance
- User requirements outside recommended controlled environments
 - Distributed Storage Systems require Shipping
 - Anomalous events